Rochester South Bypass Preliminary Earthwork Quantities

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Date: September 30, 2001

To: Steve Thornhill

From: Randy Sedlacek

Re. STB - DM&E
Project 24554
Rochester South Bypass Preliminary Earthwork Quantities

To determine preliminary earthwork quantities for the Rochester South Bypass I made a very rough profile using the 1.00% grade criteria. The rough profile assumed grade separations with the rail over the road at Highway 14 just west of Byron, at Highway 83 south of Rochester, and at Highway 52 southeast of Rochester. The rough profile also assumed none of the secondary roads crossed would be closed so the alignment tries to match the existing grades at these crossings. I determined the fill/cut depths at 86 locations along an alignment I think is close to what has been proposed. At each section location I assumed the existing grade at the centerline of the alignment didn't change across the width of the section. In some places this assumption isn't very good but in those places I assumed the amount existing was high or low on one side was compensated by the amount it was usually the opposite on the other side of the centerline. The sections did not include any ditches in the fill areas and included a 3-foot deep 10-foot wide ditch on each side in the cut areas. The sections also did not include any benching or other slope stability features for the larger fills and cuts. I used 3:1 slopes for cut areas and 2:1 for fill areas like the Rochester proposal indicated were used in their calculations. The earthwork quantities were determined using the average end area method where the cut and fill areas at two locations are averaged and the average areas are taken times the length between the two locations. Using this method I determined for the South Bypass the excavation would be 7,664,000 cubic yards and the fill would be 11,456,000 (with no shrinkage factor).

To determine more accurate preliminary cut and fill quantities I made a profile of the existing grade for the horizontal alignment using the topo from USGS 7.5' maps. This profile information was transferred to a MicroStation drawing. The rough profile was revised to better fit the existing profile. Templates for the cut and fill sections were created and these templates were moved along the profile to determine the cut and fill quantities using the Intergraph InRoads SelectCAD program. As with the average end area sections above the SelectCAD quantities were determined assuming the profile elevations were the same across the width of the sections. Using this method the South Bypass excavation would be 6,829737 cubic yards and the fill would be 6,138823 cubic yards (with no shrinkage factor). As with the average end area quantities these quantities do not include any benching or other slope stability features for the larger cuts and fills.

Triangle Volume

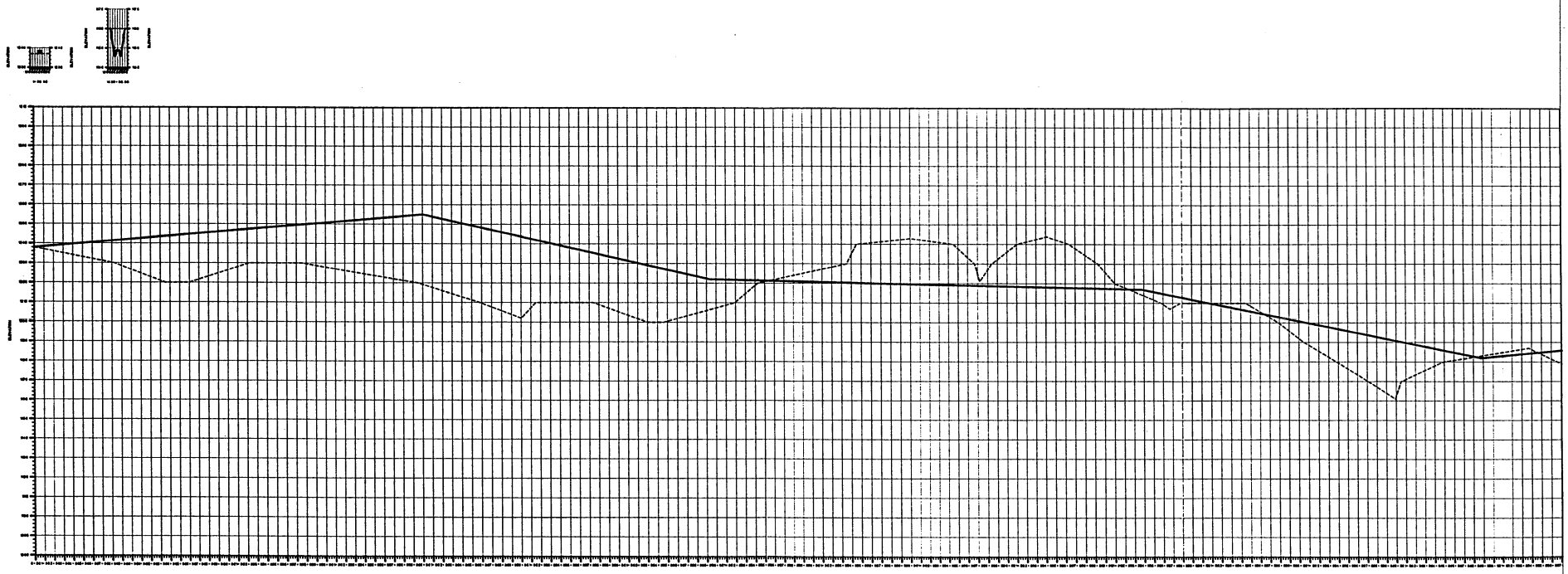
Triangle Volume Report

Original Surface: sbypspts
Design Surface: cutfill-1

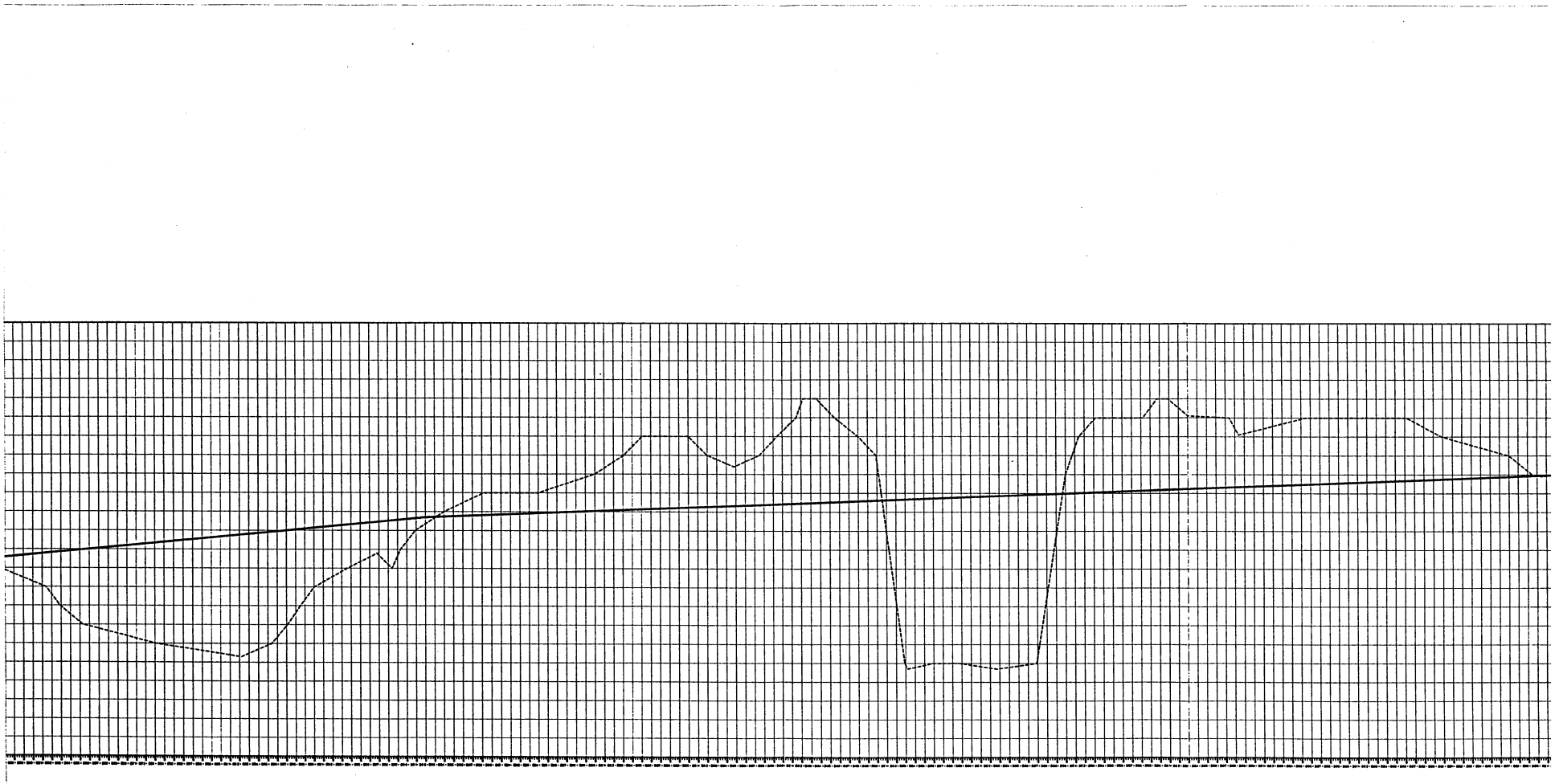
Mode: Entire Surface
Cut Factor: 1.00
Fill Factor: 1.00

Cut: 184402924.03 cu ft
Fill: 165748230.21 cu ft
Net: 18654693.82 cu ft

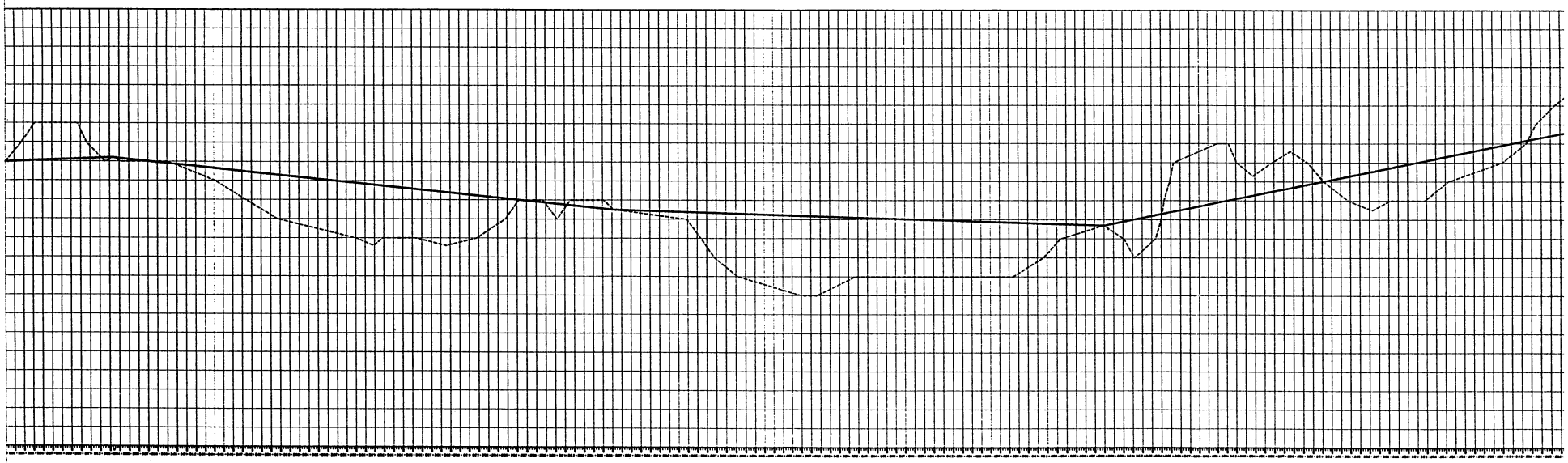
Cut: 6829737.93 cu yd
Fill: 6138823.34 cu yd
Net: 690914.59 cu yd



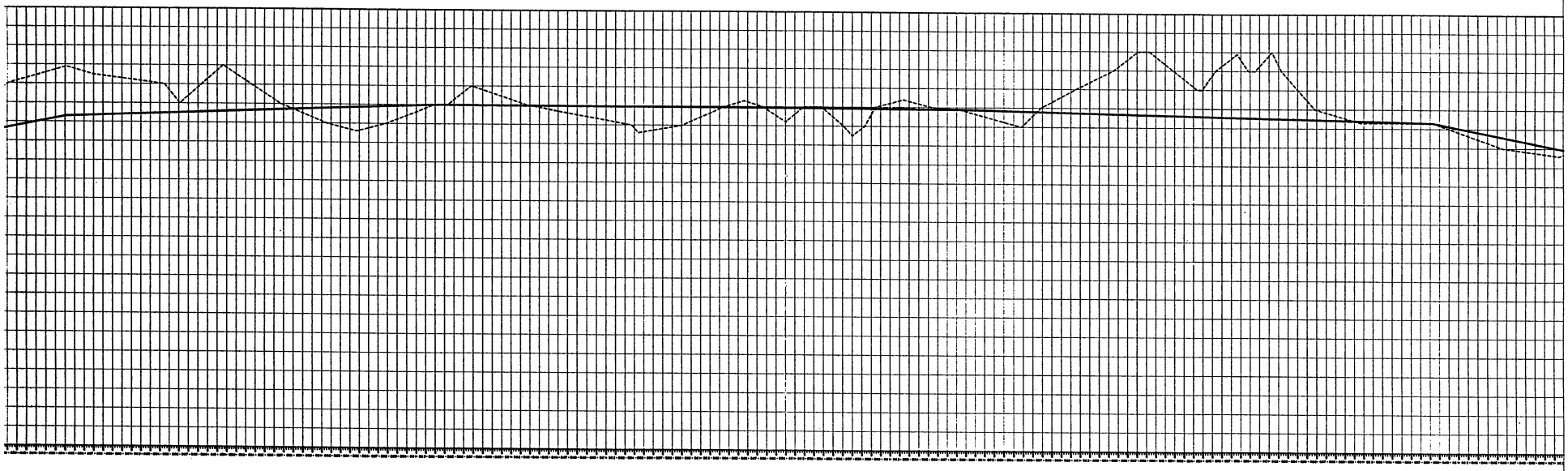
SHEET 1 OF 11



SHEET 2 OF 11



SHEET 3 OF 11



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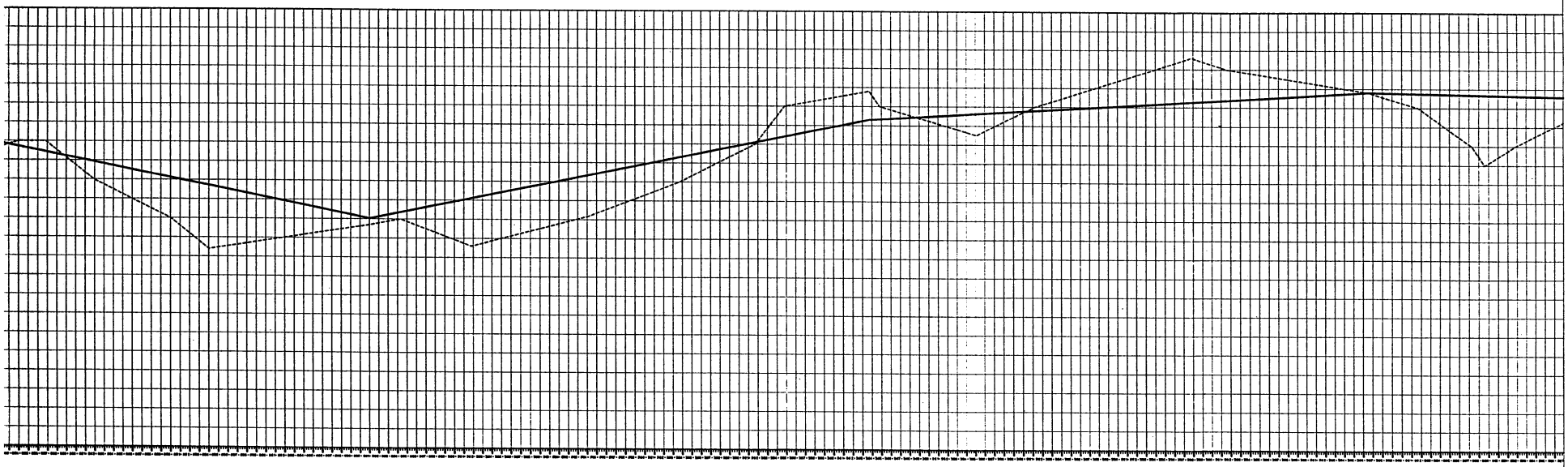

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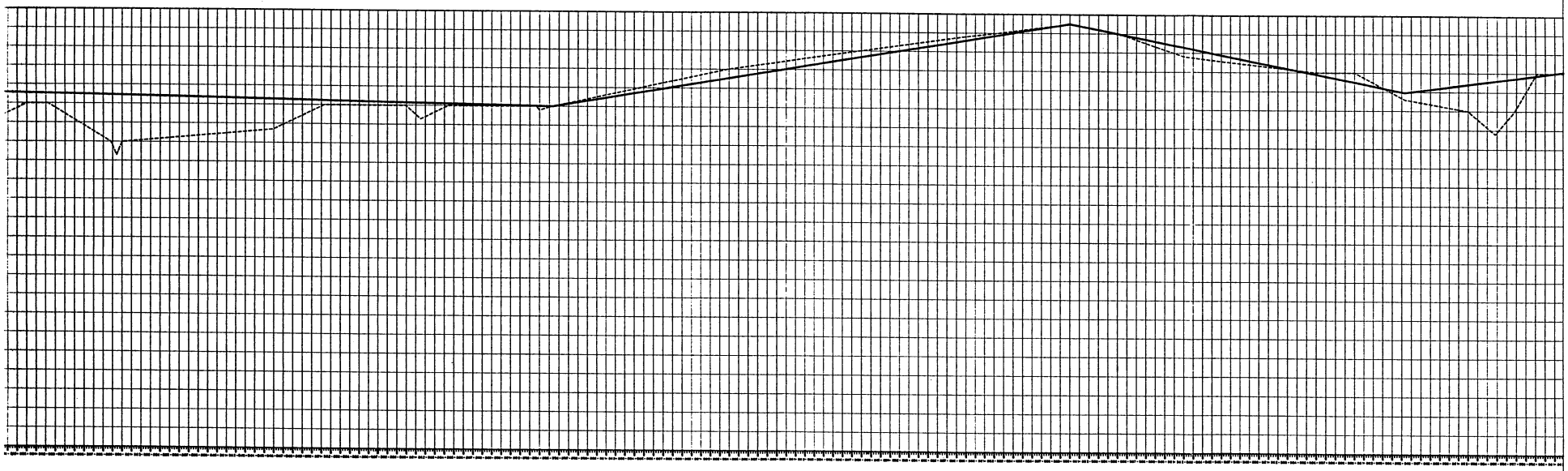
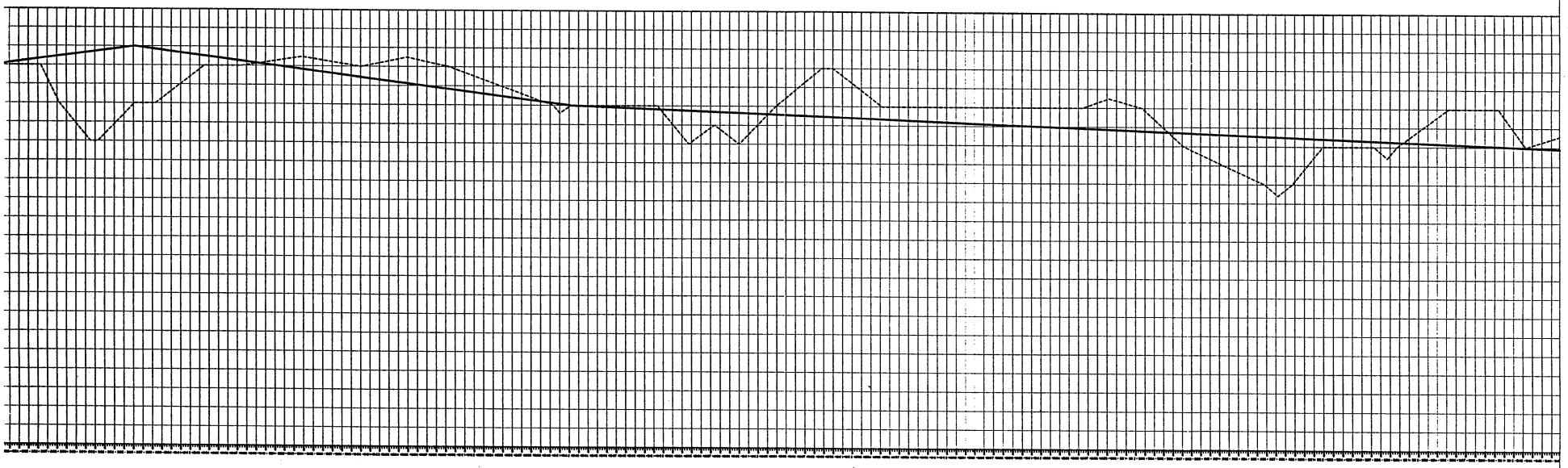


SHEET 6 OF 11



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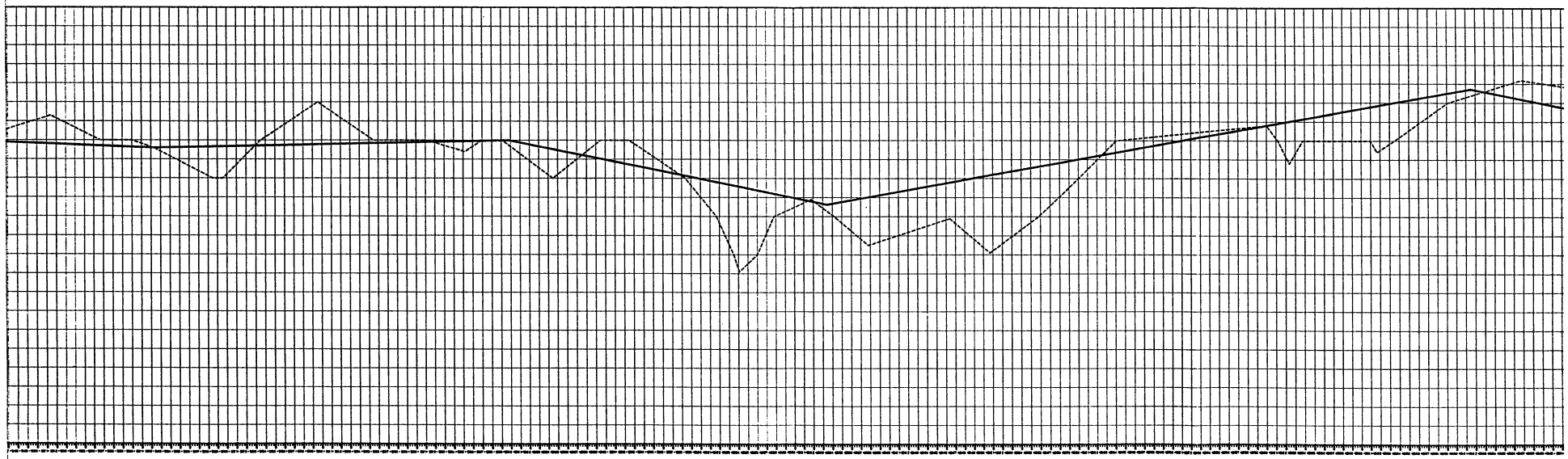

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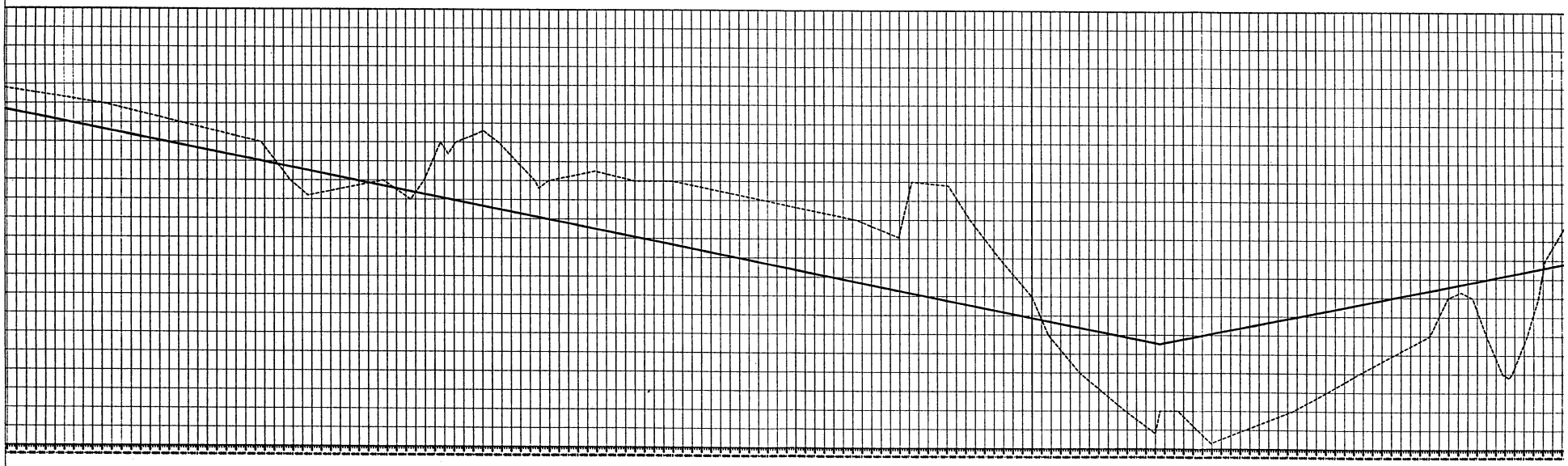

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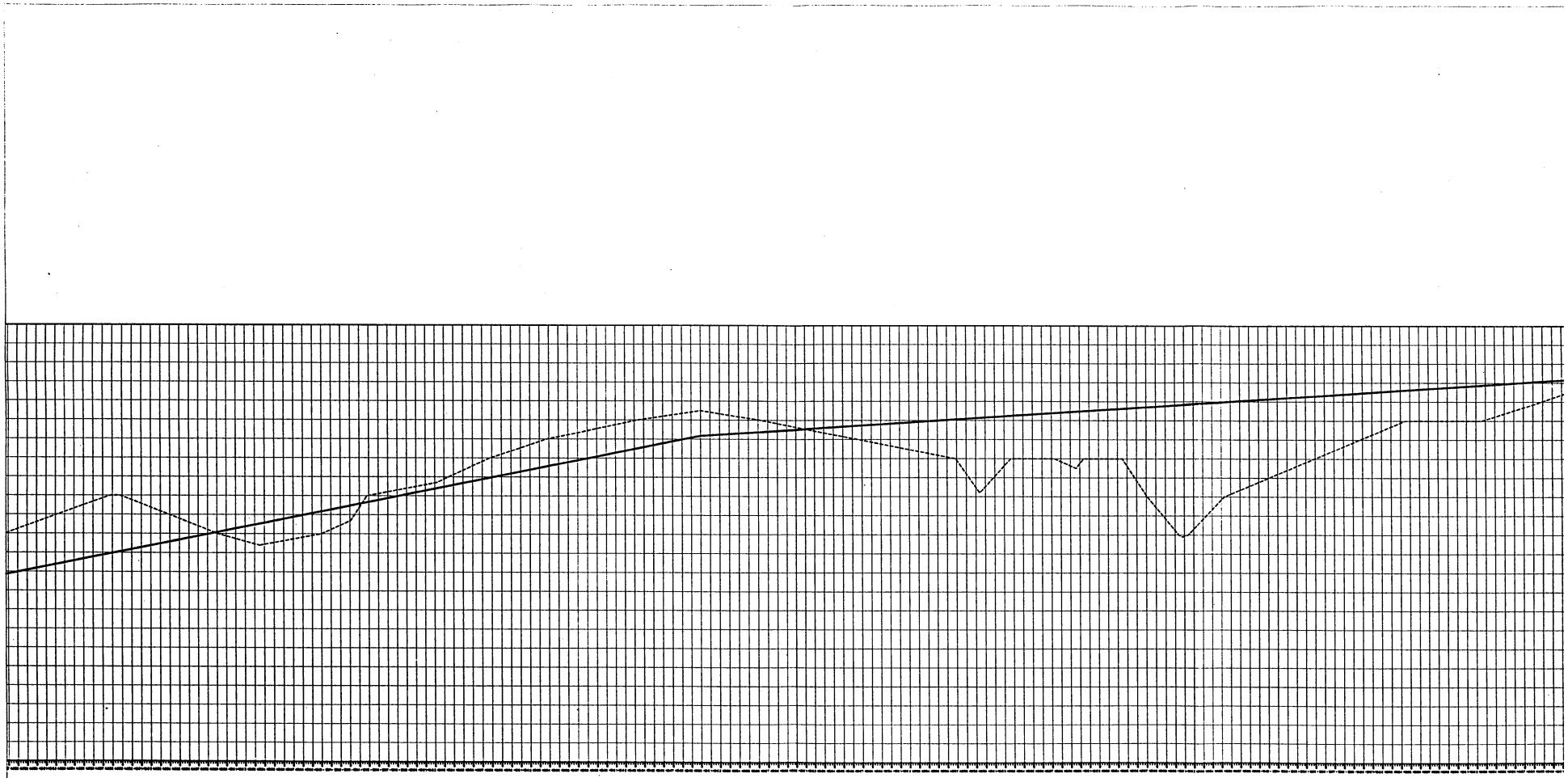
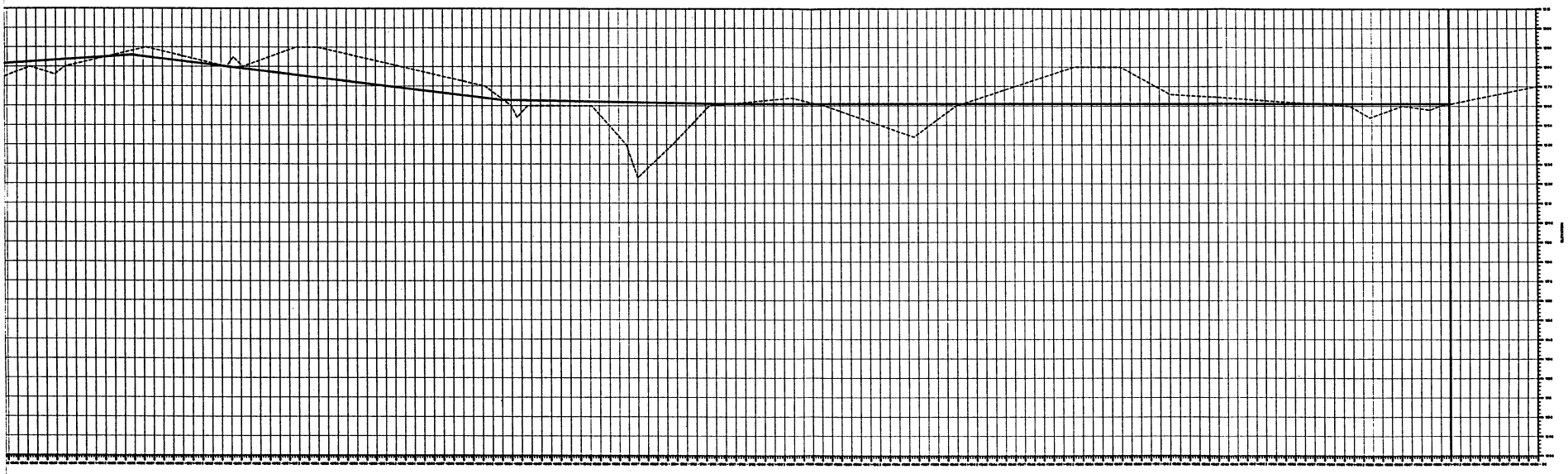


SHEET 10 OF 11



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ROCHESTER – SOUTH BYPASS Checked By _____

EXIST. PROFILE Preliminary ✓ Final _____

	STA.	EXIST.	STA.	EXIST.
-0.688	0+00	1238	139+80	1161
	8+18	1230	140+50	1170
	13+50	1220	144+80	1180
	14+75	1220	153+70	1187
	16+00	1220	156+60	1180
	22+20	1230	161+40	1170
	27+50	1230	162+80	1160
	39+50	1220	165+30	1150
	45+80	1210	173+10	1140
	50+00	1202	182+20	1133
	51+50	1210	185+40	1140
	57+40	1210	187+10	1150
	63+00	1200	188+50	1160
	64+60	1200	190+00	1170
	71+90	1210	193+60	1180
	74+25	1220	196+80	1188
	83+50	1230	198+40	1180
	84+50	1240	199+30	1190
	90+00	1243	200+90	1200
	94+50	1240	204+00	1210
	96+70	1230	208+20	1220
	97+20	1221	214+00	1220
	98+40	1230	220+00	1230
	101+00	1240	223+10	1240
	104+10	1244	225+10	1250
	106+40	1240	230+00	1250
	109+30	1230	232+00	1240
	111+00	1220	234+80	1234
	115+80	1210	237+50	1240
	116+70	1207	238+40	1250
	117+80	1210	241+50	1260
	124+50	1210	242+20	1270
	127+90	1200	243+60	1270
	130+50	1190	245+50	1260
	133+80	1180	248+00	1250
	137+10	1170	249+90	1240

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STA	EXIST.	STA	EXIST.
252+90	1130	361+90	1190
253+20	1127	365+30	1190
255+90	1130	368+60	1186
258+80	1130	371+80	1190
262+70	1127	374+80	1200
266+90	1130	376+20	1210
270+00	1230	378+70	1210
270+70	1240	380+20	1200
271+40	1250	381+60	1210
273+20	1260	385+10	1210
278+20	1260	386+20	1205
279+70	1270	393+80	1200
280+90	1270	395+40	1180
283+00	1261	396+80	1180
287+40	1260	399+20	1170
288+40	1251	406+00	1160
295+50	1260	407+60	1160
306+20	1260	411+70	1170
308+80	1250	418+60	1170
317+00	1240	424+30	1170
319+50	1230	428+40	1170
320+50	1229	431+60	1180
322+10	1230	433+40	1180
323+80	1240	438+00	1197
325+20	1250	440+10	1190
329+70	1250	441+20	1180
330+60	1240	443+40	1190
332+50	1230	444+00	1200
333+40	1232	444+30	1210
334+10	1230	444+90	1220
338+00	1230	445+30	1230
344+10	1220	450+00	1240
347+40	1210	451+20	1240
350+70	1200	452+10	1230
359+00	1190	453+80	1223
360+90	1186	455+80	1230

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STA	EXIST	STA	EXIST
457+70	1236	577+00	1245
459+50	1230	578+30	1250
461+20	1220	579+40	1260
463+80	1210	582+40	1264
466+30	1205	585+40	1260
468+20	1210	588+30	1259
470+00	1210	594+80	1250
471+80	1210	596+80	1260
474+30	1220	600+50	1220
480+00	1230	604+50	1280
482+50	1240	607+10	1280
483+50	1250	608+30	1280
485+40	1260	610+60	1280
488+00	1270	613+40	1270
494+10	1279	613+80	1270
496+80	1275	615+30	1280
504+50	1270	617+60	1289
506+60	1260	618+80	1280
516+70	1260	619+50	1280
521+50	1250	621+30	1280
524+70	1246	622+30	1280
527+80	1250	625+80	1260
532+80	1260	630+60	1253
534+30	1260	638+30	1253
536+80	1270	645+60	1240
542+80	1260	651+50	1236
553+70	1250	654+00	1240
554+40	1246	656+80	1240
559+00	1250	661+90	1220
563+60	1260	670+00	1200
565+60	1263	674+00	1184
567+60	1260	681+00	1197
570+00	1252	684+30	1200
571+80	1260	701+80	1186
573+80	1260	714+20	1202
576+10	1250	723+70	1220

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STA	EXIST	STA	EXIST
731+70	1240	972+00	1260
734+80	1260	974+80	1248
743+70	1268	976+80	1260
744+80	1260	979+10	1280
755+10	1245	986+30	1280
761+20	1260	988+20	1260
774+00	1280	991+50	1240
777+80	1286	992+30	1240
781+60	1280	996+10	1260
796+50	1268	998+30	1260
801+70	1260	1003+50	1280
807+30	1240	1007+40	1280
808+60	1230	1013+80	1285
811+80	1240	1020+00	1280
820+00	1260	1024+90	1285
822+20	1260	1029+40	1280
828+80	1240	1040+30	1260
829+40	1233	1041+00	1256
830+00	1240	1042+20	1260
845+90	1247	1051+40	1260
851+30	1260	1054+70	1240
859+90	1260	1057+40	1250
861+50	1253	1060+00	1240
864+40	1260	1063+80	1260
873+60	1260	1068+80	1280
879+00	1258	1070+00	1280
875+30	1260	1075+20	1260
893+80	1280	1080+80	1260
918+80	1298	1086+40	1260
922+50	1300	1099+20	1265
930+00	1305	1102+20	1260
935+60	1300	1107+10	1240
942+60	1288	1115+80	1220
956+00	1280	1117+20	1214
960+00	1280	1118+70	1220
965+30	1266	1121+80	1240

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STA.	EXIST.	STA.	EXIST.
1127+30	1240	1280+00	1248
1128+70	1234	1281+20	1240
1129+70	1240	1282+40	1228
1135+20	1260	1283+80	1240
1140+40	1260	1291+00	1240
1143+30	1240	1291+70	1234
1151+40	1253	1293+50	1240
1156+70	1240	1299+10	1260
1160+00	1240	1306+80	1272
1162+30	1236	1322+20	1260
1168+50	1220	1338+60	1240
1169+60	1220	1341+70	1220
1173+50	1240	1343+60	1212
1179+60	1260	1351+60	1220
1185+50	1240	1354+50	1210
1191+10	1240	1355+90	1220
1195+20	1234	1357+60	1240
1197+00	1240	1358+40	1234
1199+10	1240	1359+20	1240
1204+50	1220	1362+10	1246
1209+50	1240	1363+70	1240
1212+20	1240	1367+50	1220
1218+40	1220	1367+80	1216
1221+70	1200	1368+90	1220
1223+50	1180	1373+80	1225
1224+10	1171	1378+00	1220
1226+00	1180	1381+90	1220
1227+80	1200	1401+40	1200
1231+80	1209	1405+90	1191
1234+20	1200	1407+30	1220
1237+80	1185	1411+20	1218
1246+40	1189	1413+50	1200
1250+70	1181	1416+60	1180
1255+80	1200	1420+00	1160
1260+00	1220	1421+70	1140
1264+10	1240	1425+00	1120

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Project 24554 Date 8/25/01 Made By SEDLACEK

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STA	EXIST	STA	EXIST
1429+80	1100	1587+30	1240
1433+00	1088	1589+60	1235
1433+50	1100	1590+40	1240
1435+40	1100	1594+50	1240
1438+80	1083	1597+10	1220
1447+50	1100	1600+40	1200
1450+40	1108	1600+80	1199
1454+60	1120	1601+40	1200
1462+00	1140	1605+30	1220
1463+80	1160	1612+50	1240
1465+30	1163	1624+50	1260
1466+50	1160	1632+60	1260
1468+00	1140	1638+80	1270
1469+70	1120	1644+40	1280
1470+40	1118	1646+80	1276
1470+70	1120	1647+80	1280
1472+30	1140	1656+30	1280
1473+50	1160	1664+60	1280
1474+20	1180	1665+30	1285
1476+60	1200	1666+30	1280
1487+80	1220	1671+80	1280
1488+80	1220	1674+00	1280
1499+10	1200	1682+70	1280
1503+50	1194	1691+30	1270
1510+00	1200	1694+00	1260
1513+10	1207	1694+60	1254
1514+80	1220	1695+70	1260
1522+20	1227	1702+20	1260
1527+80	1240	1705+80	1240
1533+80	1250	1707+00	1223
1543+30	1260	1710+60	1240
1550+00	1265	1714+40	1260
1556+30	1260	1722+90	1264
1576+90	1240	1726+40	1260
1579+40	1222	1735+60	1244
1582+70	1240	1740+00	1260

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STA	EXIST	STA	EXIST.
1752+30	1280		
1757+00	1280		
1762+40	1266		
1780+70	1260		
1782+80	1254		
1786+20	1260		
1789+00	1258		
1790+00	1260		
1800+00	1270		

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Project No. 24554 Date 8/26/01 Made By SEDLACEK

Location ROCHESTER SOUTH BYPASS Checked By _____

Material 3:1 CUT SLOPES / 2:1 FILL SLOPES PRELIMINARY

Earthwork Computations

Station	Distance Between Sections Cut	Distance Between Sections Fill	Excavation Earth End Areas Sq. Ft.	Excavation Earth End Areas Sq. Ft.	Excavation Earth Double End Area Sq. Ft.	Excavation Earth Double End Area X L/100	Excavation Earth Volume Cu. Yd.	Embankment End Areas Sq. Ft.	Embankment End Areas Sq. Ft.	Embankment Double End Area Sq. Ft.	Embankment Double End Area X L/100	Embankment Volume Cu. Yd.	% Shrinkage	Embankment Plus Shrinkage Cu. Yd.
10+00														
	2800									1584		82,133		
38+00									1584					
43+00									2944					
	2200									5158		210,141		
65+00									2214					
	3500			5817		377,028				2214		143,500		
90+00			5817											
	700			7237		93,813								
97+00			1420											
	800			6832		101,215								
105+00			5412											
	1200			5412		120,267				225		5,000		
117+00									225					
	300			411		2283				225		1,250		
120+00			411											
	1800			411		14,461				2581		90,813		
138+00									2581					
	1100									2683		54,654		
150+00									102					
	3200									15177		889,378		
182+00									15075					
	2800			669		34,689				15075		281,667		
210+00			669											
	1700			3405		107,194								
227+00			2736											
	1600			3177		94,133								
243+00			441											
	2000			441		16,333				26814		993,111		
263+00									26814					
	2700			144		7,200				26814		1,342,700		
290+00			144											
	1000			2313		42,833								
300+00			2169											
	2000			2169		80,333				601		22,259		
320+00									601					
	500									1217		11,269		
325+00									616					
	3500									3782		245,130		
360+00									3166					
	2000									3530		130,741		
380+00									364					
	1400			316		8,193				364		9,437		
394+00			316											
	1300			316		7,607				1849		47,937		
407+00									1849					
	2000									4609		110,957		
427+00									2760					
	2300			5544		236,133				2760		102,222		
450+00			5544											
	1000			6213		115,056								
460+00			669											
	600			669		7,433				1360		15,111		
466+00									1360					
	2400			2169		96,400				1360		60,444		
500+00			2169											
	2500			2169		100,417				870		40,278		
525+00									870					

(1,663,021) (5,388,132)

Volume in Cubic Yards = Distance in Stations x Double End Area x 1.85185 = $\frac{100}{2 \times 27}$

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012793 Form C-3

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Project No. 24554 Date 8/26/01 Made By SEDLACEK

Location ROCHESTER - SOUTH BYPASS Checked By _____

Material 3:1 CUT SLOPES / 2:1 FILL SLOPES PRELIMINARY

Earthwork Computations

Station	Distance between Sections Cut	Distance between Sections Fill	Excavation Earth End Areas Sq. Ft.	Excavation Earth End Areas Sq. Ft.	Excavation Earth Double End Area Sq. Ft.	Excavation Earth Double End Area XL/100	Excavation Earth Volume Cu. Yd.	Embankment End Areas Sq. Ft.	Embankment End Areas Sq. Ft.	Embankment End Areas Double End Area Sq. Ft.	Embankment Double End Area XL/100	Embankment Volume Cu. Yd.	Embankment % Shrinkage	Embankment Plus Shrinkage Cu. Yd.
525+00									870					
	1500				1197		33,250			870		24,167		
540+00				1197										
	2000				1197		44,333		870			32,222		
560+00										870				
	500				552		5,111			870		8,056		
565+00				552										
	1200				552		12,267		870			19,333		
577+00										870				
	600				598		6,644			870		9,667		
583+00				598										
	2500				6807		315,139							
608+00				6209										
	3200				6249		370,314							
640+00				40										
	34+00				40		2,519			2254		141,919		
674+00									2254					
	2600				40		1,926			2254		108,526		
700+00				40										
	3000				40		2,222		572			31,778		
730+00										572				
	1000				2677		49,574			572		10,593		
740+00				2677										
	1500				2677		74,361		340			6,297		
755+00										340				
	2500				669		30,972			340		15,791		
780+00				669										
	3000				669		37,167			2882		160,111		
810+00									2882					
	1000									3101		57,426		
820+00									219					
	1000									2800		51,852		
830+00									2581					
	1000									3332		61,704		
840+00									751					
	500									1913		17,713		
845+00									1162					
	1000				326		6,037			1162		21,519		
855+00				326										
	2000				326		12,074			190		7,037		
875+00									190					
	1000									1150		21,296		
885+00									960					
	3500				356		23,074			960		62,222		
920+00				356										
	4000				356		26,370			190		14,074		
960+00									190					
	1500									1263		35,083		
975+00									1073					
	800				296		4,385			1073		15,886		
983+00				296										
	800				296		4,933			5864		87,733		
992+00									5864					
	3300				1788		109,267			5864		358,356		
1025+00				1788										
	3300				1788		109,267		2187			133,650		
1058+00										2187				
	1200				621		13,800			2187		48,600		
1070+00				621										

Volume in Cubic Yards = Distance in Stations x Double End Area x 1.85185 = $\frac{100}{2 \times 27}$ (1,295,003) (1,572,571)

Burns & McDonnell

012793 Form C-3

Client _____ Page 3 Of _____

Project No. 24554 Date 8/26/01 Made By SEDLACEK

Location ROCHESTER – SOUTH BYPASS Checked By _____

Material 3:1 CUT SLOPES / 2:1 FILL SLOPES PRELIMINARY

Earthwork Computations

Station	Distance Between Sections Cut	Distance Between Sections Fill	Excavation Earth End Areas Sq. Ft.	Excavation Earth End Areas Sq. Ft.	Excavation Earth Double End Area Sq. Ft.	Excavation Earth Double End Area XL/100	Excavation Earth Volume Cu. Yd.	Embankment End Areas Sq. Ft.	Embankment End Areas Sq. Ft.	Embankment End Areas Double End Area Sq. Ft.	Embankment Double End Area XL/100	Embankment Volume Cu. Yd.	Embankment % Shrinkage	Embankment Plus Shrinkage Cu. Yd.
1070+00				621										
	4700				621		54,050			2944		256,237		
1117+00									2944					
	1800				2278		75,933			2944		98,133		
1135+00				2278										
	900				2278		37,967			64		1,067		
1144+00									64					
	1100				1435		29,231			64		1,304		
1155+00				1435										
	1500				1435		39,861			1025		28,472		
1170+00									1025					
	1000				1528		28,296			1025		18,981		
1180+00				1528										
	4500				5537		461,417							
1225+00				4009										
	1000				4009		74,240			190		3,519		
1235+00									190					
	300									1550		8,611		
1238+00									1360					
	1200									5680		126,222		
1250+00									4320					
	2500				552		25,556			4320		200,000		
1275+00				552										
	600				552		6,133			942		10,467		
1281+00									942					
	2900									1006		54,026		
1310+00									64					
	3400									1402		88,274		
1344+00									1338					
	3100				3186		182,900			1338		76,811		
1375+00				3186										
	3000				5391		299,500							
1405+00				2205										
	2800				2205		114,333			7665		387,444		
1433+00									7665					
1436+00									7665					
	2900				2896		155,526			7665		411,639		
1465+00				2896										
	500				2896		26,815			1976		18,286		
1470+00									1976					
	500				6613		61,231			1976		18,296		
1475+00				6613										
	1300				13824		332,800							
1488+00				7211										
	6200				15363		1,763,900							
1550+00				8152										
	5000				8152		754,815			7640		702,407		
1600+00									7640					
	7000				6029		133,389			7640		990,370		
1670+00				1029										
	2500				1029		47,639			4684		216,852		
1705+00									4684					
	8500									4786		753,352		
1790+00									102					
							(4,705,532)					(4,485,780)		

Volume in Cubic Yards = Distance in Stations x Double End Area x 1.85185 = $\frac{100}{2 \times 27}$

Burns & McDonnell

012793 Form C-3

Client _____ Page 4 Of _____

Project No. 24554 Date 8/26/01 Made By SEDLACEK

Location ROCHESTER - SOUTH BYPASS Checked By _____

Material 3:1 CUT SLOPES / 2:1 FILL SLOPES PRELIMINARY

Earthwork Computations

Station	Distance Between Sections Cut	Distance Between Sections Fill	Excavation Earth End Areas Sq. Ft.	Excavation Earth End Areas Sq. Ft.	Excavation Earth Double End Area Sq. Ft.	Excavation Earth Double End Area XL/100	Excavation Earth Volume Cu. Yd.	Embankment End Areas Sq. Ft.	Embankment End Areas Sq. Ft.	Embankment Double End Area Sq. Ft.	Embankment Double End Area XL/100	Embankment Volume Cu. Yd.	% Shrinkage	Embankment Plus Shrinkage Cu. Yd.
					PAGE 1		1,663,021					5,398,132		
					PAGE 2		1,295,003					1,572,571		
					PAGE 3		4,705,533					4,485,780		
							7,663,556					11,456,483		

Volume in Cubic Yards = Distance in Stations x Double End Area x 1.85185 = $\frac{100}{2 \times 27}$

Burns & McDonnell

012793 Form C-3

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client _____ Page 1 of _____

Project 24554 Date 8/26/01 Made By SEDLACEK

ROCHESTER - SOUTH BYPASS Checked By _____

Preliminary ✓ Final _____

STA	EXIST.	NEW	HEIGHT	AREA
10+00	1232	1232	0	0
38+00	1230	1252	22	1584
BRIDGE				
43+00	1220	1252	32	2944
65+00	1200	1227	27	2214
80+00	1245	1213	-32	-5817
87+00	1225	1213.5	-11.5	-1420
105+00	1245	1214.5	-30.5	-5410
117+00	1210	1215.7	5.7	225
120+00	1220	1216	-4.0	-441
139+00	1170	1199.6	29.6	2581
150+00	1187	1190	3	102
182+00	1125	1205.1	80.1	15,075
210+00	1225	1219	-6	-669
227+00	1255	1236	-19	-3736
243+00	1250	1246	-4	-441
263+00	1130	1239	109	26,814
290+00	1250	1249	-1	-144
300+00	1265	1249	-16	-2169
320+00	1230	1241.7	11.7	601
325+00	1250	1238.1	11.9	616
360+00	1185	1218.4	33.4	3166
380+00	1200	1208.2	8.2	364
394+00	1200	1197.2	-2.8	-316
407+00	1160	1184.2	24.2	1849
427+00	1160	1190.8	30.8	2760
450+00	1240	1209	-31	-5544
460+00	1225	1219	-6	-669
466+00	1205	1225	20	1360
500+00	1275	1259	-16	-2169
525+00	1245	1260	15	870
540+00	1270	1260	-10	-1197
560+00	1245	1260	15	870
565+00	1265	1260	-5	-552
577+00	1245	1260	15	870

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client _____ Page 2 of _____

Project _____ Date _____ Made By _____

Checked By _____

Preliminary _____ Final _____

STA	EXIST	NEW	HEIGHT	AREA
583+00	1265	1259.6	-5.4	-598
608+00	1290	1256.6	-33.4	-6209
640+00	1250	1251.3	1.3	-40
674+00	1190	1217.3	27.3	2254
700+00	1210	1211.3	1.3	-40
730+00	1230	1241.3	11.3	572
740+00	1270	1251.3	-18.7	-2677
755+00	1250	1257.8	7.8	340
780+00	1270	1264.0	-6	-669
810+00	1235	1266.6	31.6	2882
820+00	1260	1265.6	5.6	219
830+00	1235	1264.6	29.6	2581
840+00	1250	1263.6	13.6	751
845+00	1245	1263.1	18.1	1162
855+00	1265	1262.1	-2.9	-326
875+00	1255	1260	5	420
885+00	1250	1266	16	960
920+00	1300	1296.8	-3.2	-356
960+00	1280	1285	5	420
975+00	1255	1272.2	17.2	1073
983+00	1285	1282.4	-2.6	-296
992+00	1240	1287.6	47.6	5,864
1025+00	1285	1271.2	-13.8	-1788
1058+00	1230	1256.8	26.8	2187
1070+00	1260	1254.4	-5.6	-621
1117+00	1215	1247	-32	2944
1135+00	1260	1243.4	-16.6	-2278
1144+00	1240	1242	2	64
1155+00	1250	1239.4	-11.6	-1435
1170+00	1220	1236.7	16.7	1025
1180+00	1250	1237.8	-12.2	-1528
1225+00	1190	1214.9	-24.9	-4009
1235+00	1205	1210	5	420
1238+00	1190	1210	20	1360

Burns & McDonnell
SINCE 1898

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Client _____ Page 3 of _____

Project _____ Date _____ Made By _____

Checked By _____

Preliminary _____ Final _____

STA	EXIST	NEW	HEIGHT	AREA
1250+00	1180	1220	40	4320
1275+00	1250	1245	-5	-552
1281+00	1235	1250.8	15.8	942
1310+00	1270	1272	2	64
1344+00	1215	1234.8	19.8	1,338
1375+00	1225	1203.8	-21.2	-3,186
1405+00	1200	1183.8	-16.2	-2,205
1433+00	1100	1155.3	55.3	7,665
BRIDGE				
1436+00	1100	1155.3	55.3	7665
1465+00	1160	1140.2	-19.8	-2896
1470+00	1120	1145.2	25.2	1976
1475+00	1185	1150.2	-34.8	-6,613
1480+00	1220	1163.2	-36.8	-7,211
1550+00	1265	1225.2	-39.8	-8,152
1600+00	1200	1255.2	55.2	7,640
1670+00	1285	1276.2	-8.8	-1029
1705+00	1220	1261.9	41.9	4,684
1790+00	1260	1263	3	102

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

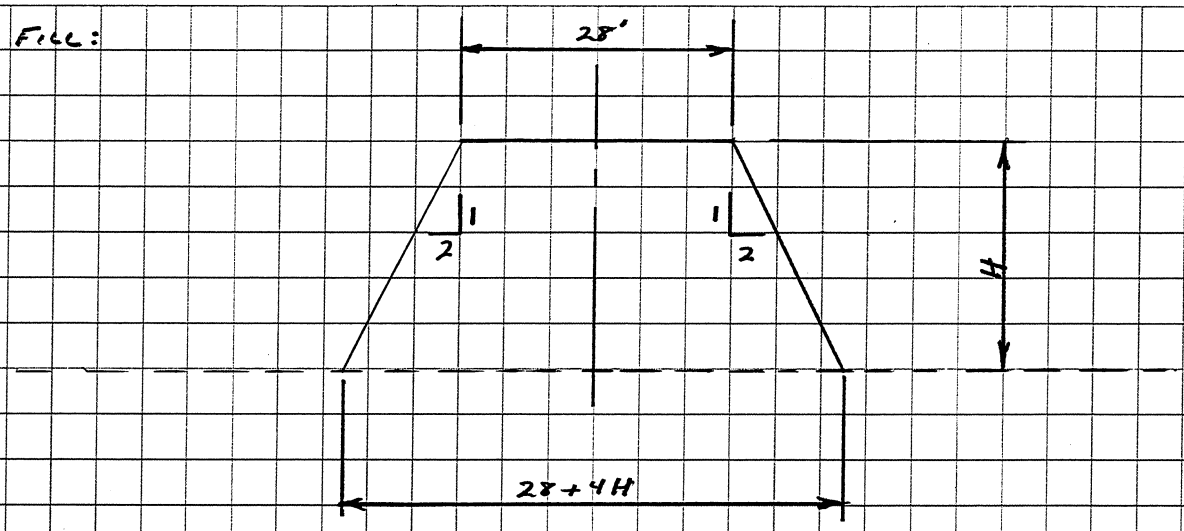
Client _____ Page 1 of _____

Project 24554 Date 8/22/01 Made By SEDLACEK

CUT & FILL TEMPLATES Checked By _____

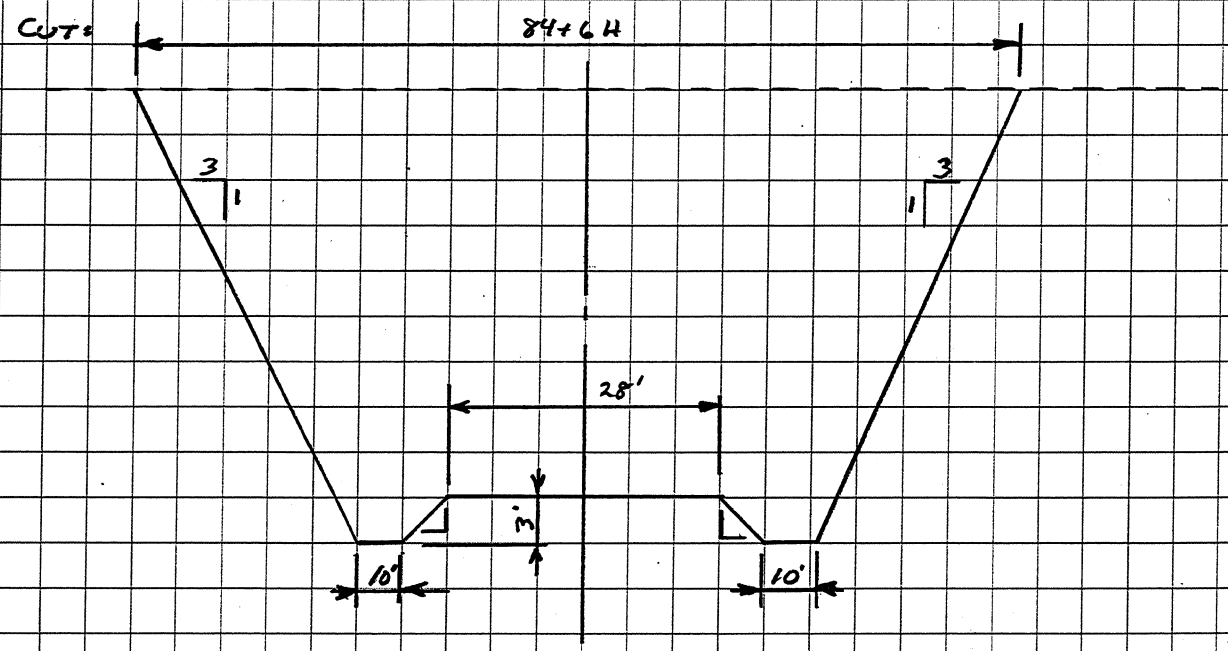
Preliminary — Final _____

FILL:

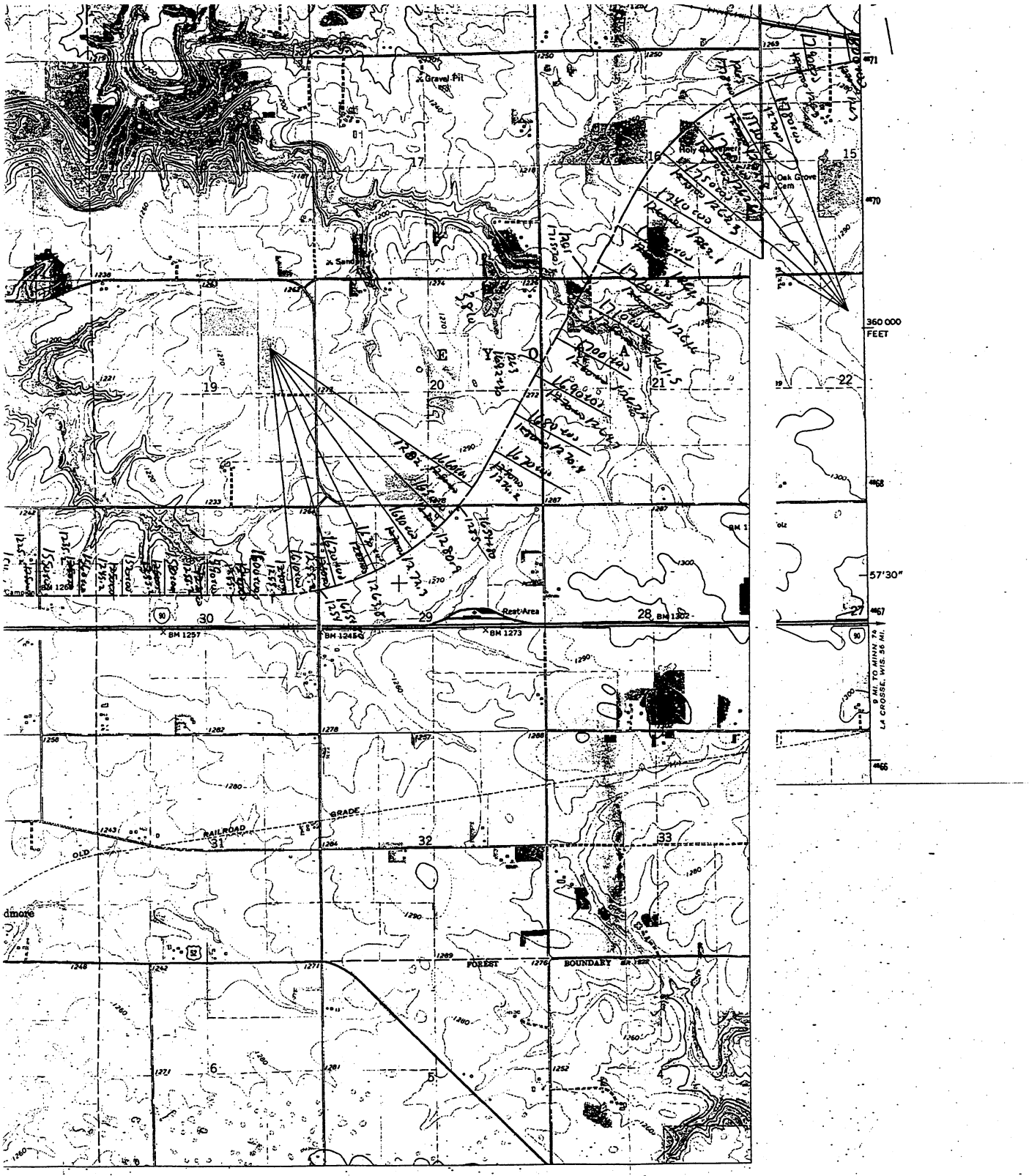


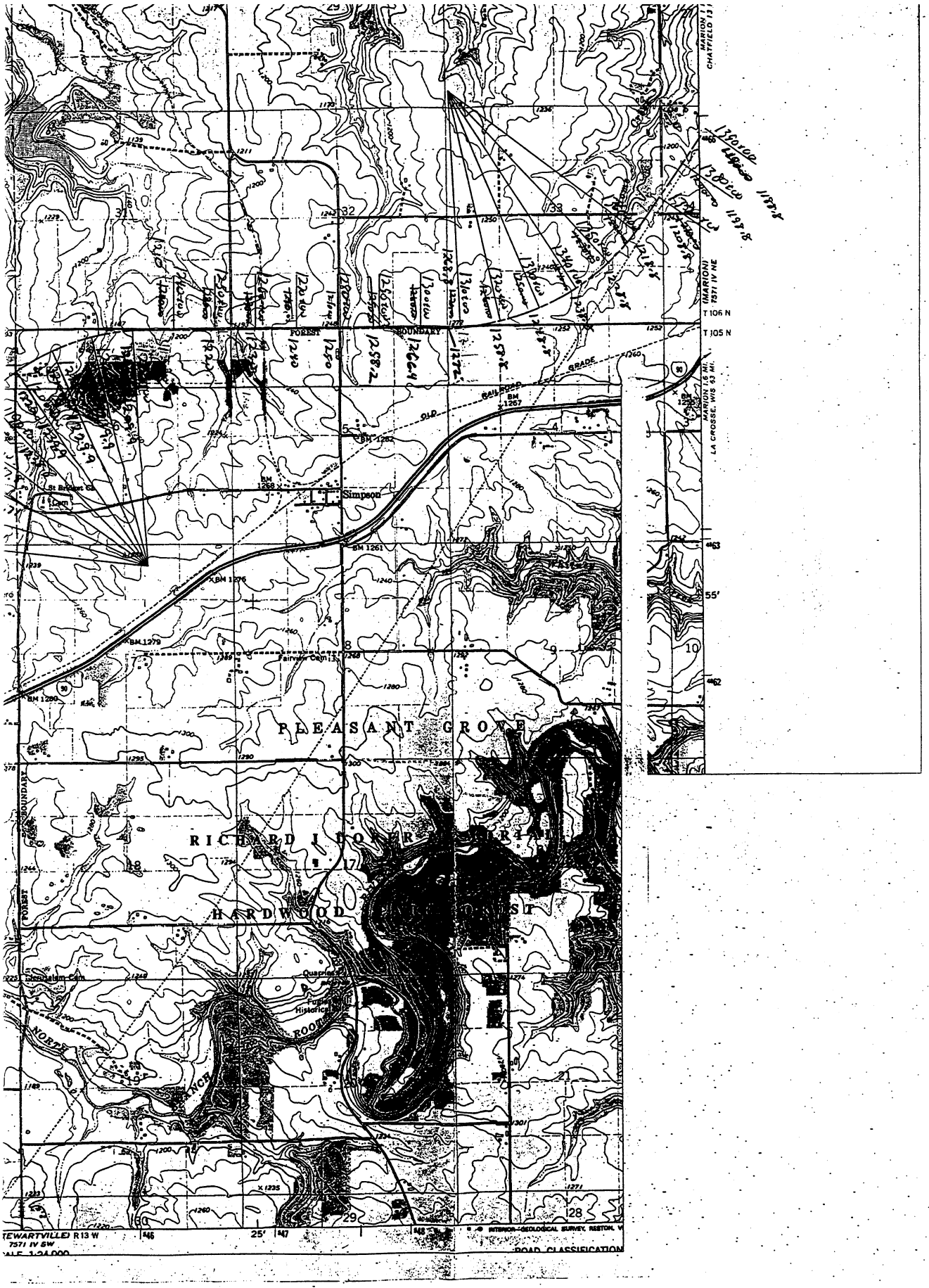
$$A = \tfrac{1}{2}(28 + 28 + 4H)\,H$$
$$= 28H + 2H^2$$

CUT:

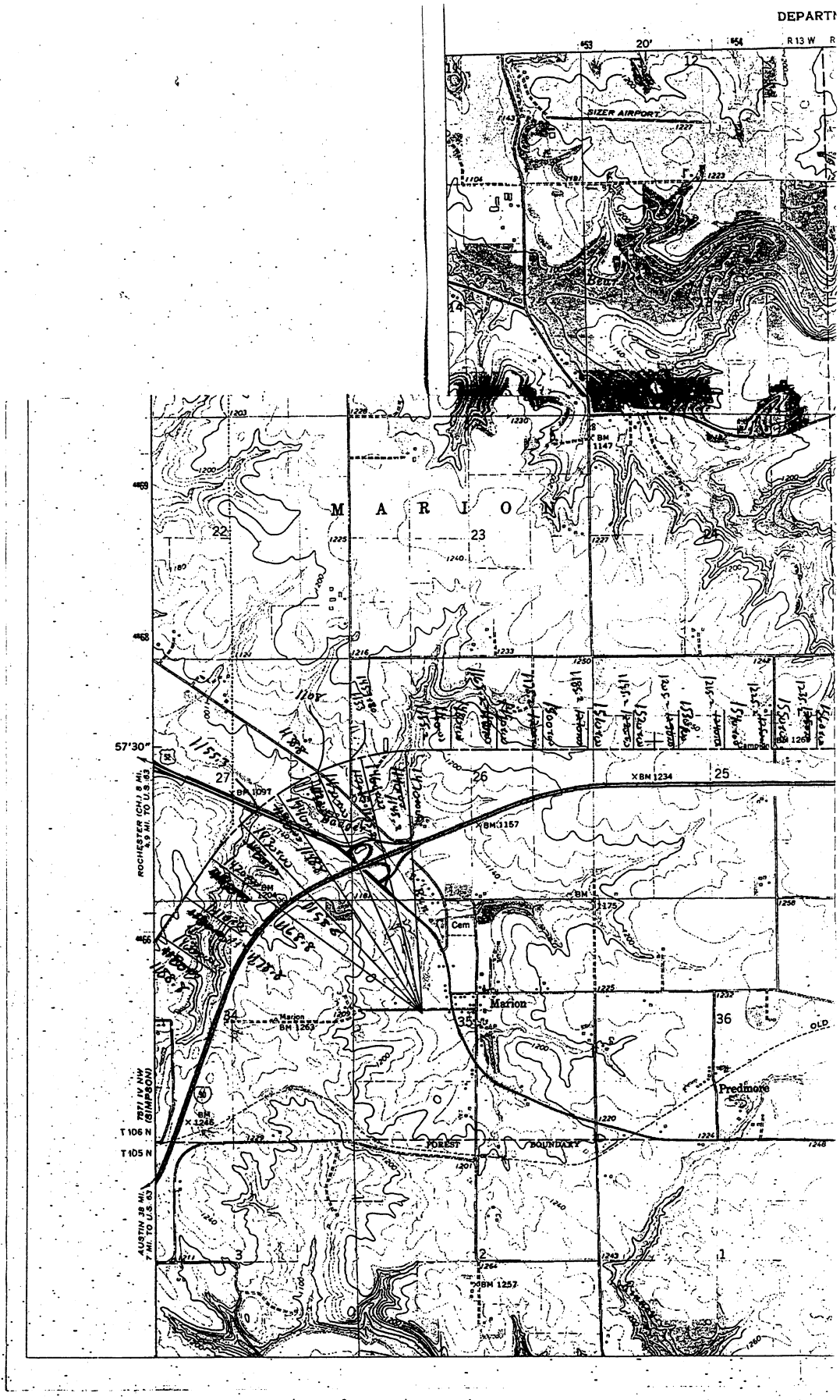


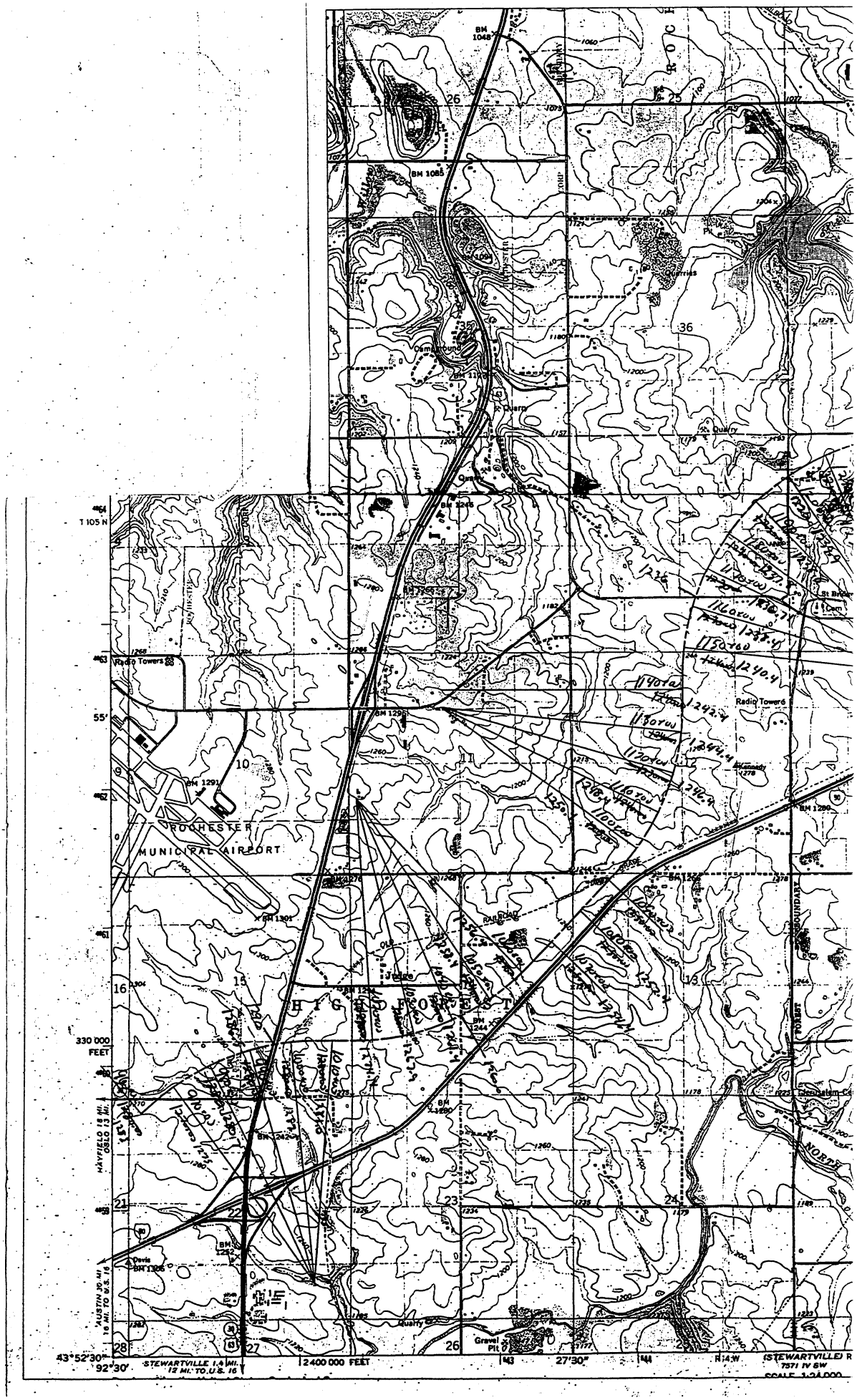
$$A = \tfrac{1}{2}(84 + 84 + 6H)\,H + 2\left[\tfrac{1}{2}(10 + 28)\,3\right]$$
$$= 84H + 3H^2 + 57$$

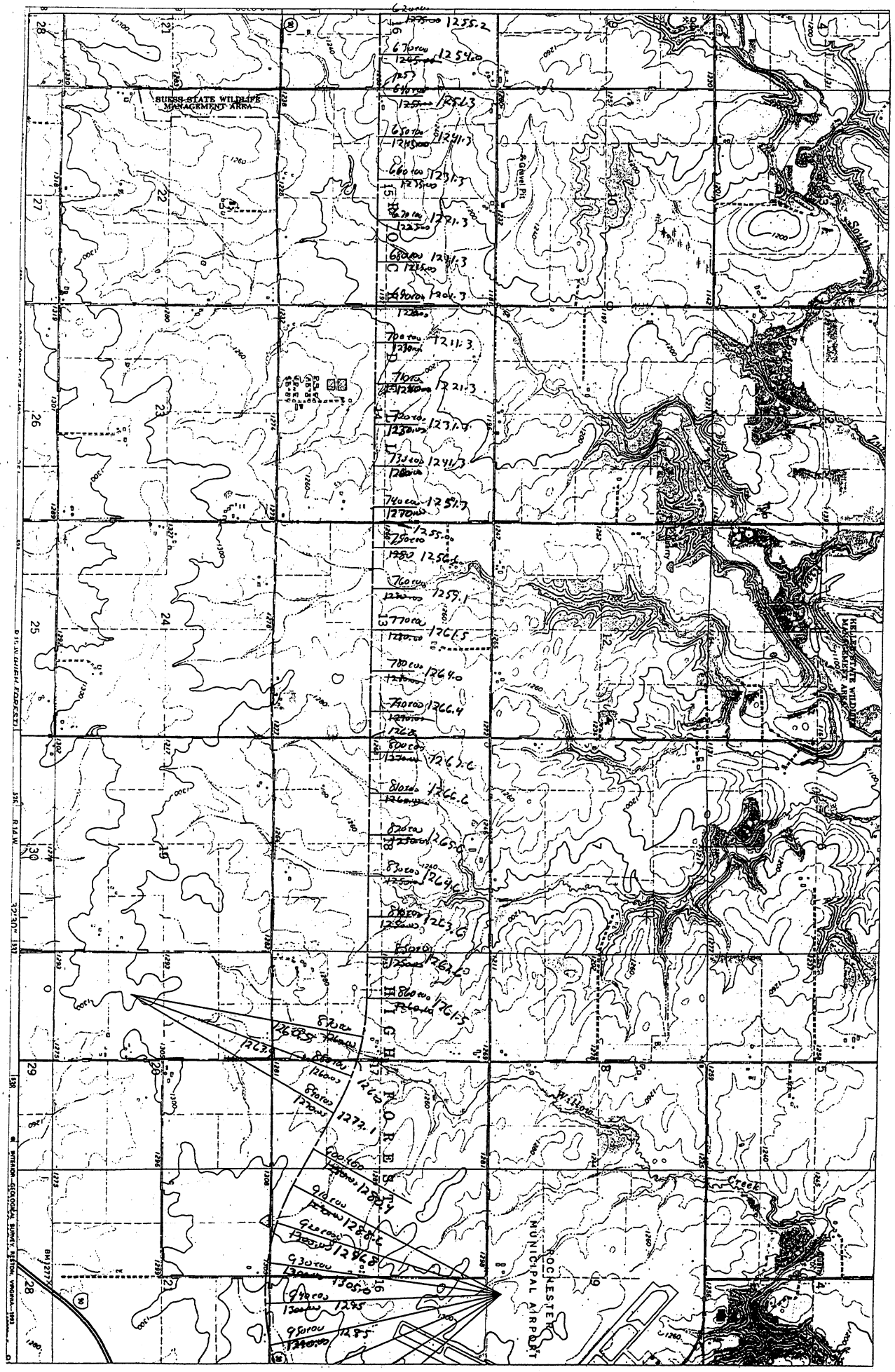

Gravel Pit
Sand
Holy Sepulcher
Oak Grove Cem
360 000 FEET
57'30"
Rest Area
BM 1302
BM 1257
BM 1245
BM 1273
9 MI. TO MINN. 74
LA CROSSE, WIS. 56 MI.
OLD RAILROAD GRADE
FOREST BOUNDARY

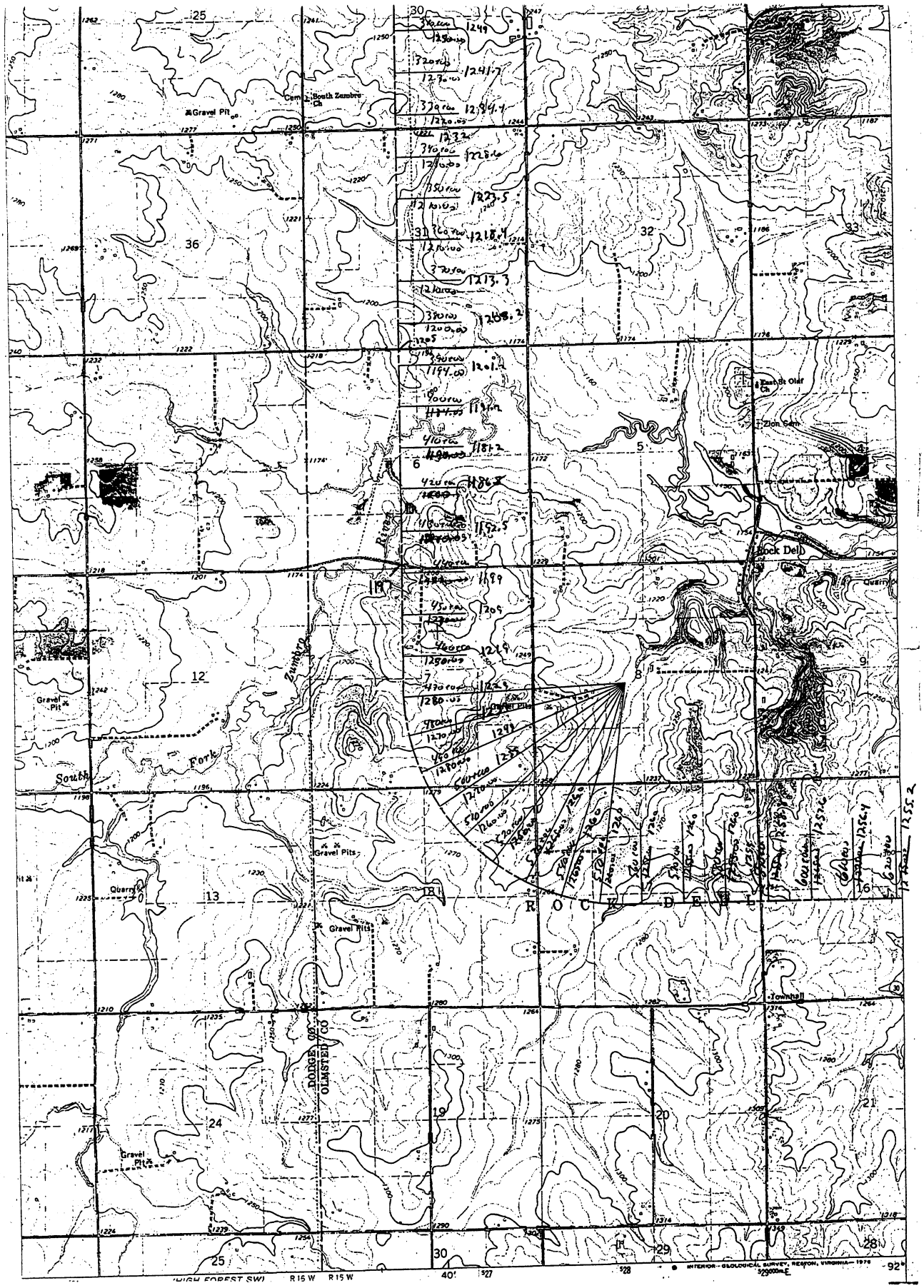


Simpson
PLEASANT GROVE
RICHARD J DOKER
HARDWOOD
FOREST BOUNDARY
OLD RAILROAD GRADE
T 106 N
T 105 N
(MARION) 7571 IV NE
MARION 1.6 MI.
LA CROSSE, WIS 63 MI.
(TEWARTVILLE) R 13 W
7571 IV SW
INTERIOR—GEOLOGICAL SURVEY, RESTON, V
ROAD CLASSIFICATION

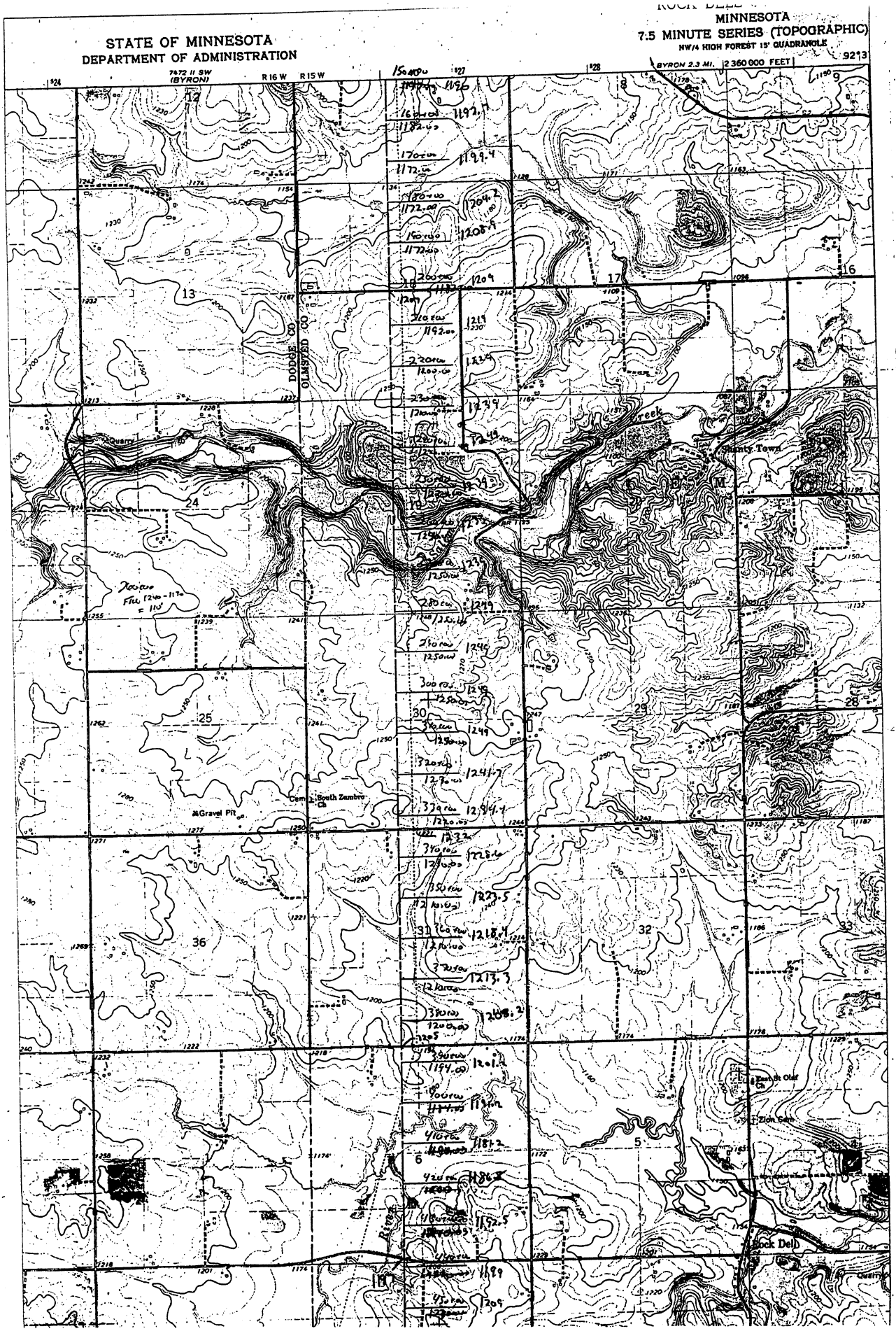

DEPARTM
SIZER AIRPORT
M A R I O N
Marion
Predmore
FOREST BOUNDARY
ROCHESTER (CH.) 8 MI. 4.9 MI. TO U.S. 63
AUSTIN 38 MI. 7 MI. TO U.S. 63
T 106 N
T 105 N
57'30"
BM 1234
BM 1157
BM 1097
BM 1263
BM 1257
BM 1147
Cem
OLD

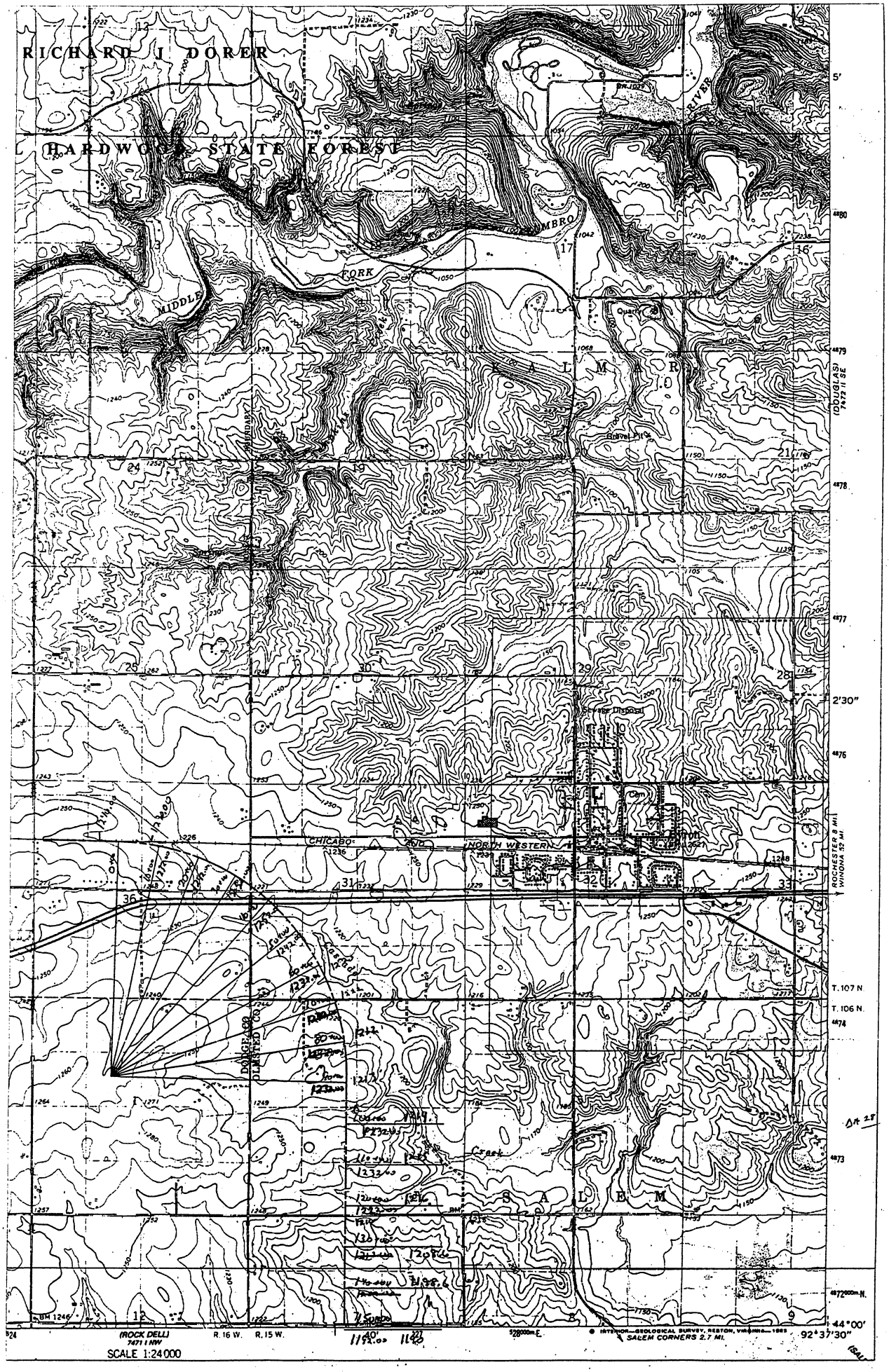

ROCHESTER
MUNICIPAL AIRPORT
HIGHFOREST
Radio Towers
Radio Towers
Quarries
Quarry
Gravel Pit
Cemetery
Jackson
Davis
Austin
Stewartville
Oakwood
Cemetery
RAILROAD
BM 1085
BM 1048
BM 1291
BM 1301
BM 1290
BM 1244
BM 1242
BM 1206
BM 1245
BM 1266
BM 1295
BM 1222
BM 1259
BM 1242
BM 1252
BM 1178
BM 1179
BM 1234
BM 1177
BM 1182
BM 1260
BM 1264
BM 1268
BM 1279
BM 1275
BM 1270
BM 1260
BM 1264
BM 1244
BM 1234
BM 1229
BM 1178
BM 1179


SUESS STATE WILDLIFE MANAGEMENT AREA
Gravel Pit
South
Willow
Creek
ROCHESTER MUNICIPAL AIRPORT
HIGH FOREST
1255.2
1254.0
1251.3
1241.3
1231.3
1221.3
1211.3
1221.3
1231.3
1241.3
1251.3
1255.0
1256.6
1259.1
1261.5
1264.0
1266.4
1267.6
1266.6
1265.6
1264.6
1263.6
1262.6
1261.5
1272.1
1280.4
1288.6
1296.8
1305.0
1295
1285



Gravel Pit
South Zumbro Ch
East St Olaf Ch
Zion Cem
Rock Dell
Quarry
Gravel Pits
South Fork Zumbro River
ROCK DELL
Townhall
DODGE CO
OLMSTED CO
R 16 W
R 15 W
INTERIOR - GEOLOGICAL SURVEY, RESTON, VIRGINIA - 1976


STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION
MINNESOTA
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 HIGH FOREST 15' QUADRANGLE
BYRON 2.3 MI.
2 360 000 FEET
R16W
R15W
DODGE CO
OLMSTED CO
Quarry
Shanty Town
Creek
Gravel Pit
South Zambro Ch
East St Olaf Ch
Zion Cem
Rock Dell
River


RICHARD J. DORER
HARDWOOD STATE FOREST
MIDDLE
FORK
RIVER
Quarry
Gravel Pit
Sewage Disposal
CHICAGO AND NORTH WESTERN
Byron
DODGE CO
OLMSTED CO
Creek
T. 107 N.
T. 106 N.
ROCHESTER 8 MI.
WINONA 52 MI.
(DOUGLAS)
7472 II SE
(ROCK DELL)
7471 I NW
R. 16 W.
R. 15 W.
SCALE 1:24000
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1963
SALEM CORNERS 2.7 MI.
44°00'
92°37'30"
2'30"